

AN OVERVIEW OF THE *BRICKELLIA* (*KUHNTIA*)
EUPATORIIOIDES (ASTERACEAE, EUPATORIEAE) COMPLEX

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ABSTRACT

Kuhnia eupatorioides is the generitype and principal species of the genus *Kuhnia*, which was retained by most workers up to the time of Shinnars (1971), who reduced all of its members to synonymy under *Brickellia*. Subsequently, many workers have followed this submergence. Shinnars recognized 7 species in the complex: *B. schaffneri*, *B. leptophylla* (with 2 varieties), *B. chlorolepis*, *B. oreithales*, *B. mosieri*, *B. eupatorioides* (with 4 varieties) and *B. adenolepis*. The distribution and morphological characters which distinguish these taxa are discussed and it is proposed that among those plants known to Shinnars, only 3 species are involved: *B. oreithales* (a Mexican, montane element of SW Chihuahua and adjacent Durango); *B. adenolepis* (a local endemic of Jalisco, México); and *B. eupatorioides* (a widespread species of the U.S.A. and adjacent México). The latter species is believed to be composed of 6 regional varieties, 5 of which are contiguous, and all but one of which intergrade to some considerable extent with their allopatric consorts; these are: 1) var. *eupatorioides* of the eastern U.S.A., which grades into var. *tezana* to the southwest and into the more western var. *corymbulosa* to the west and northwest; 2) var. *tezana* (including var. *ozarkana*), which grades into the var. *corymbulosa* to the west and with var. *eupatorioides* to the east; 3) var. *corymbulosa*, which grades into the var. *eupatorioides* to the northeast and into the var. *tezana* to the southeast and into the more montane var. *chlorolepis* to the west and south; 4) var. *gracillima*, of south central Texas, which grades into the var. *chlorolepis* to the west; 5) var. *floridana* (of which *B. mosieri* is a synonym), which is disjunct in south Florida from the other taxa; and 6) var. *chlorolepis* which occurs in the more montane western portions of the U.S.A. extending southwards along the Central Plateau to south central México. The var. *chlorolepis* contains as synonyms the following taxa recognized by Shinnars: *B. chlorolepis*, *B. microphylla*, *B. schaffneri* and *B. leptophylla* var. *mezicana*. A key to the various taxa is provided and maps showing their distributions are constructed.

The only new combinations needed to accommodate the above treatment are *B. eupatorioides* var. *chlorolepis* (Woot. & Standl.) B. Turner; *B. eupatorioides* var. *gracillima* (A. Gray) B. Turner; and *B. eupatorioides* var. *floridana* (R. Long) B. Turner.

KEY WORDS: Asteraceae, Eupatorieae, *Brickellia*, *Kuhnia*, United States, México.

The genus *Kuhnia* has been retained as distinct from *Brickellia* by most workers (Robinson 1917; Fernald 1950; Steyermark 1963; Correll & Johnston 1970; Barkley 1986; etc.) up to the time of its submergence into the latter by Shinnars (1971). Subsequent workers (e.g. McVaugh 1984; King & Robinson 1987), including the present author, have agreed with this submergence, there being few, if any, characters by which to distinguish between them.

Shinnars (1946) rendered a definitive revision of the group, treating these as I have indicated in the above abstract. His was an excellent treatment, based upon the study of several thousand specimens and, to a limited extent, field work with most of the taxa in the United States. For a complete synonymy of the taxa recognized in the present paper, the interested reader is referred to the treatments of Shinnars (1946; 1971). Where I differ with his nomenclature, this is discussed in the account that follows.

Shinnars was most familiar with the widespread *Brickellia eupatorioides* and treated this as comprising 4 regional varieties: an eastern var. *eupatorioides*, a western var. *corymbulosa*, and the var. *ozarkana* and var. *tezana*, which together occupied a relatively narrow range between the varieties *eupatorioides* and *corymbulosa*. Shinnars was well aware that these several taxa intergraded and cited several intermediates. Unfortunately, he tended to identify most of the plants he examined (by annotation or citation) as either this or that variety, without indication of intermediacy, tending to rely on only 1 or 2 of his "key characters" for recognition purposes. This resulted in the occasional occurrence of "typical" elements outside of the purported range of his recognized varieties; though, for the most part, his arrangement is solid, (except for his ignoring, by annotation, the many intermediate plants he must have examined).

The complexity of the *Brickellia eupatorioides* group is well illustrated in the treatment of this complex by Steyermark (1963), who mapped 3 varieties as occurring in Missouri. As shown by his dot map, var. *eupatorioides* occurs throughout the state; var. *corymbulosa* occurs mostly in the northwestern portion of the state; and var. *tezana* (as var. *angustifolia*) occurs in the central and southern portions of the state. In 2 widely separated counties of Missouri, he shows the occurrence of all 3 of these varieties in each of the counties. Indeed, the state of Missouri is an area, within the broader region of *B. eupatorioides*, where several of the varieties of *B. eupatorioides* come into contact

and presumably intergrade, hence the difficulty in assigning names, especially where individuals are labeled as opposed to populations. It is unlikely that this intergradation is due to present day hybridization between distinct taxa; rather, the intergradation is probably more the result of a sorting out of this or that combination of characters due to local or regional climatic or edaphic factors so that a mosaic of characters might occur in regions of contact. In any case, the only utilitarian way to treat such variation is to provide names for the **populational** units concerned as best one can, based upon the characters that, in combination, best exemplify those populations.

In the overview that follows, I have treated var. *texana* and var. *ozarkana*, both recognized by Shinnery (1946; 1971), as the same; he distinguished these largely by floret number (the former said to possess 18-33 florets per head vs 10-14 florets) and little else. Because of this, I see no point in the recognition of 2 taxa. Possibly the var. *texana* (including var. *ozarkana*), with its filiform outer phyllaries, evolved *in situ* out of the ancestral complex which gave rise to the var. *corymbulosa* to the northwest and var. *eupatorioides* to the east.

Shinnery recognized *B. chlorolepis* as a good species, differing from *B. eupatorioides* by its sessile or subsessile, mostly narrower leaves, and reportedly, fewer heads in looser clusters on longer peduncles. Nevertheless, he clearly noted (1951, p. 125) that "intermediates with [*B. e.* var. *corymbulosa*] occur in eastern Colorado, northwestern Texas and adjacent New Mexico" which is painfully so, and because of this I reduce *B. chlorolepis* to varietal status under *B. eupatorioides*. The var. *chlorolepis* largely occupies the drier, more montane, portions of Colorado, New Mexico, Arizona and Texas, extending southwards along the Central Plateau of México to near México City. The var. *corymbulosa* occurs primarily in the great central grasslands of the U.S.A. from Canada to central Texas.

Within México, Shinnery (1946) proposed *Kuhnia microphylla* to accommodate specimens from the southern Central Plateau which were said to be small (10-30 cm high) with relatively large involucre (8.8-11.2 mm high). He subsequently resurrected the name *Brickellia schaffneri* for this (because of changes in the Code of Botanical Nomenclature) and the latter name was accepted by McVaugh (1984) in his treatment of *Brickellia* for the *Flora Novo-Galiciana*. McVaugh noted, however, that the ranges of *B. chlorolepis* and *B. schaffneri* (*sensu* Shinnery) appear to coincide in the Central Plateau of México and that "it is very difficult to distinguish between these taxa." Indeed, I cannot treat *B. schaffneri* as anything but a synonym of var. *chlorolepis*.

Amongst the Mexican taxa recognized by Shinnery (1946; 1971), this leaves only *B. leptophylla* var. *mexicana*, which is typified by material from near Cd. Durango, Durango; the only other specimens cited by Shinnery were thought to be doubtful, perhaps belonging to *B. chlorolepis*, these being a Pringle collection from near Chihuahua City, Chihuahua and a Wright collection from New Mexico (U.S.A.). In my opinion, all of these are but leaf forms of var.

chlorolepis. Certainly, they do not relate directly to *B. leptophylla* (= *B. e. var. gracillima*). The latter is typified by material from central Texas and is treated here as a localized varietal endemic, largely because it seems to be confined to stream bottoms along the Balcones Escarpment.

The map (Figure 1) showing the general distribution of *Brickellia eupatorioides* and its 6 varieties in the U.S.A. is based upon the numerous citations of Shinnars (1946) and several hundred collections assembled since his study (TEX,LL). The map (Figure 1) showing the general distribution of *B. eupatorioides*, and the dot maps of *B. adenolepis* and *B. oreithales* in México, are mostly based upon the numerous specimens of these taxa housed at LL and TEX.

KEY TO TAXA WITHIN THE *B. EUPATORIOIDES* COMPLEX

1. Mature heads mostly pendulous or nodding, in a raceme-like capitulescence; w Chihuahua and Durango (México) 2. *B. oreithales*
1. Mature heads not pendulous, mostly erect or ascending in a terminal or subterminal, stiffly branching capitulescence (2)
 2. Involucral bracts, some or most of them, with glandular ciliate margins; montane mesophytic habitats of S Zacatecas, Aguascalientes and Jalisco (México) 1. *B. adenolepis*
 2. Involucral bracts without glandular ciliate margins; widespread, mostly drier woodlands and grassland habitats (U.S.A. to south-central México) *B. eupatorioides* (3)
3. Stem leaves narrowly linear, 1-3 mm wide (5)
3. Mid stem leaves linear, lanceolate, or narrowly ovate, mostly 3-30 mm wide (4)
 4. Heads with 9-13 florets; southernmost Florida var. *floridana*
 4. Heads with 15-25 florets; south central Texas var. *gracillima*
5. Mid stem leaves predominantly sessile or subsessile, the blades mostly 2-9 mm wide; ultimate peduncles mostly 1-10 cm long; montane regions of western U.S.A. (Colima, New Mexico, Arizona, W Texas) and Central Plateau of México var. *chlorolepis*
5. Mid stem leaves mostly with petioles 1-10 mm long, the blades mostly 6-50 mm wide; ultimate peduncles mostly 0.2-2.0 cm long; eastern temperate deciduous forests and grasslands of the central U.S.A. (6)

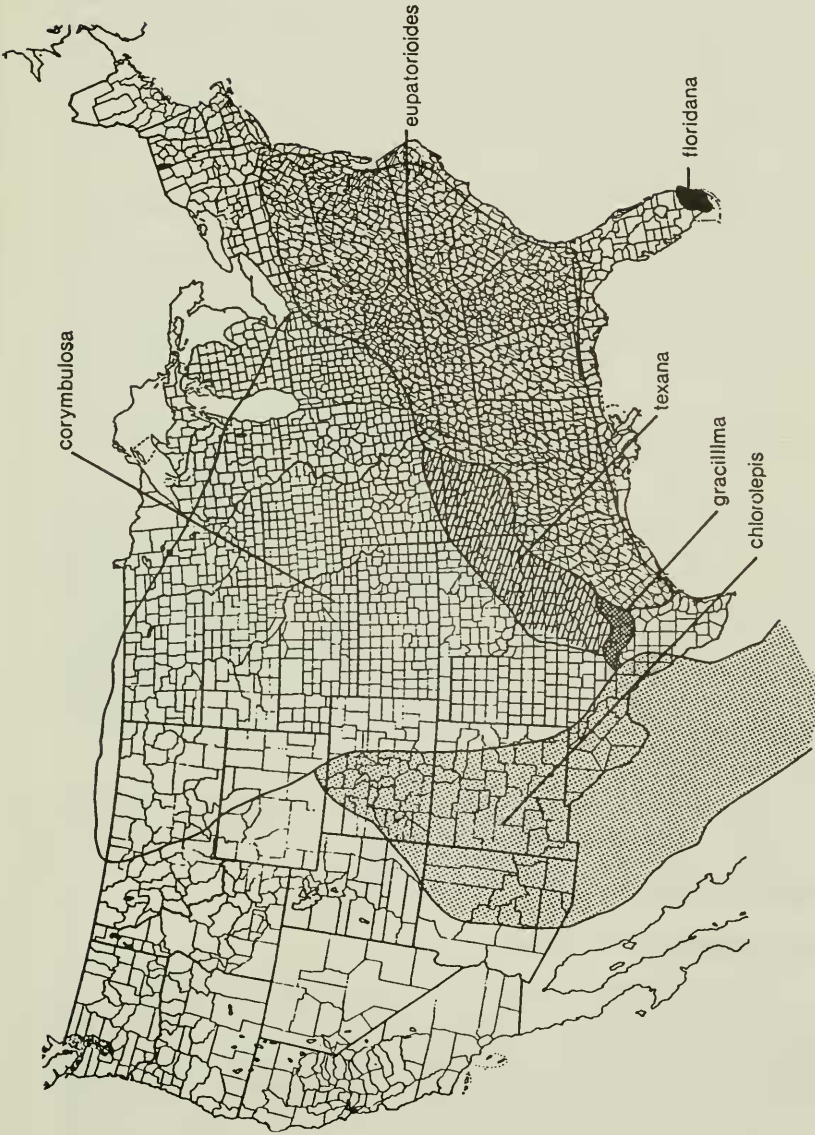


Fig. 1.. Generalized distribution of *B. eupatorioides* showing varieties.

6. Middle and outer involucre bracts mostly with elongate, filiform, often contorted, apices, usually 1/2 as long or more than the inner bracts; central Texas northeastwards to S Illinois var. *texana*
6. Middle and outer involucre bracts acute or merely acuminate, mostly not contorted and usually 1/2 or less as long as inner bracts (7)
7. Involucres mostly 7-11 mm high; florets mostly 6-15 per head; mostly sandy or silty soils in forested areas of the eastern U.S.A. var. *eupatorioides*
7. Involucres mostly 9-15 mm high; florets mostly 15-35 per head; mostly calcareous or silty clay soils in grassy areas of the central and western U.S.A. var. *corymbulosa*
1. *Brickellia adenolepis* (B.L. Robins.) Shinnery, Sida 4:274. 1971. BA-SIONYM: *Kuhnia adenolepis* B.L. Robins.

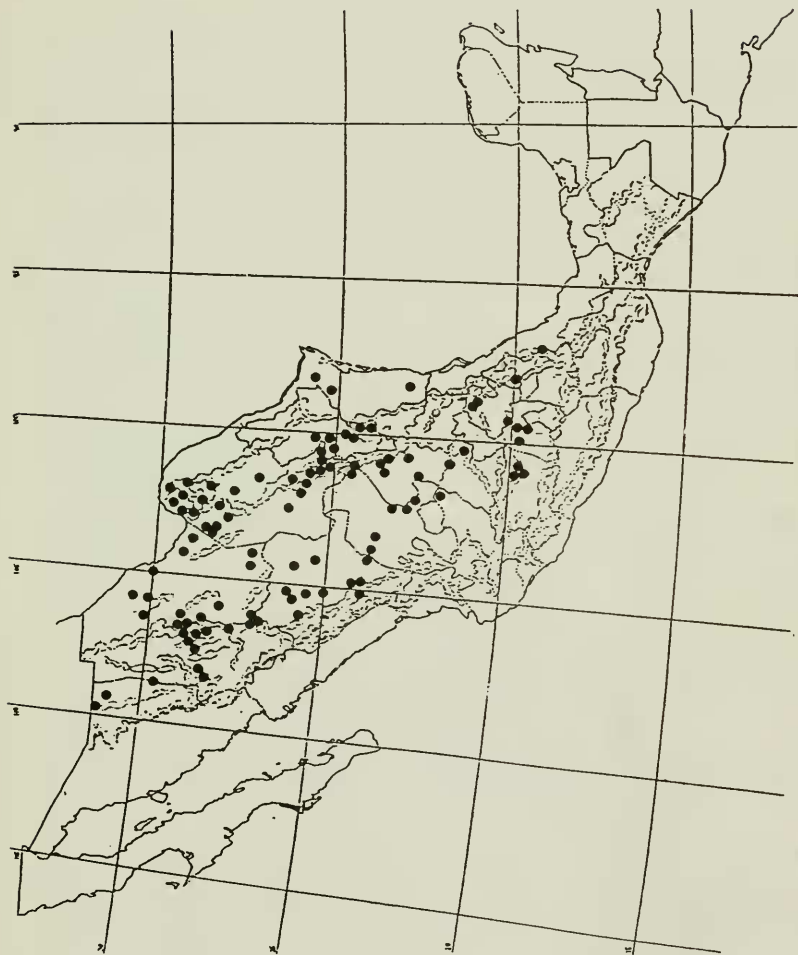
Distribution as shown in Figure 3 where it reportedly occurs in pine-oak forests from 1500 to 2300 m (McVaugh 1984). The species appears closely related to *B. oreithales*, both taxa possessing simple, mostly unbranched, stems and relatively naked capitulescences. McVaugh, who provided a thorough description, noted that the heads of *B. adenolepis* may droop prior to anthesis, but at maturity these become stiffly erect on slender peduncles, much like those of *B. eupatorioides*. So far as known, the small, peculiar, brown, glandular hairs found along the margins of the involucre bracts are unique among the *Kuhnia* complex.

2. *Brickellia oreithales* (B.L. Robins.) Shinnery, Sida 4:274. 1971. BA-SIONYM: *Kuhnia oreithales* B.L. Robins.

Brickellia extranea McVaugh.

Kuhnia triplinervis S.F. Blake.

Distribution as shown in Figure 3. Closely related to *B. adenolepis* but readily distinguished by several characters, as noted in the above key. McVaugh (1984) compared his *B. extranea* with *B. adenolepis* but in my opinion it is synonymous with *B. oreithales*, differing from the latter only in its somewhat shorter hairs along the pappus bristles. The type is from the southernmost portion of the distribution of *B. oreithales* and the length of the pappus hairs becomes somewhat longer northwards. *Brickellia oreithales* is occasionally mistaken for *B. eupatorioides* var. *chlorolepis*, with which it is partially sympatric; the latter however, occurs in drier sites at lower elevations.

Fig. 2. Distribution of *var chlorolepis* in Mexico.

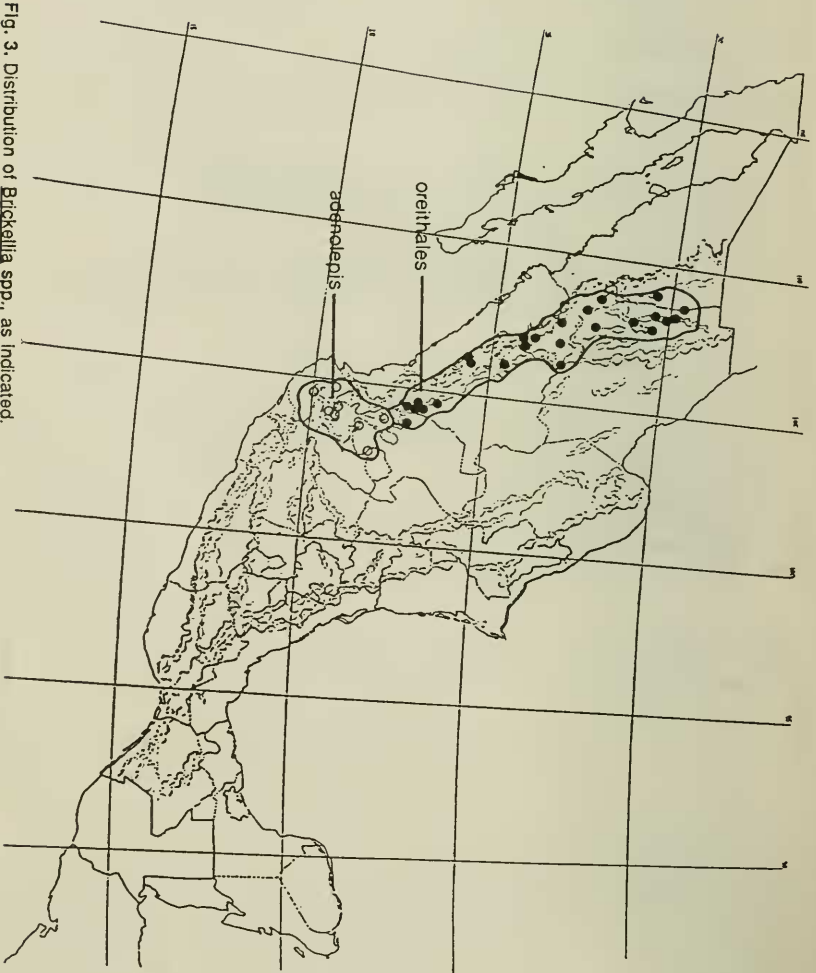


Fig. 3. Distribution of *Bickellia* spp., as indicated.

4. *Brickellia eupatorioides* (L.) Shinnery, Sida 4:274. 1971. var. *eupatorioides*

Distribution as shown in Figure 1. Shinnery (1946) has given a fairly complete synonymy. I add here the recently proposed *Brickellia rosmarinifolia* (Vent.) W.A. Weber, Phytologia 53:187. 1985, at least as to intent (for which see the discussion under var. *chlorolepis*, below).

4a. *B. eupatorioides* var. *tezana* (Shinnery) Shinnery, Sida 4:274. 1971. *Kuhnia eupatorioides* var. *tezana* Shinnery.

Brickellia eupatorioides var. *ozarkana* (Shinnery) Shinnery. *Kuhnia eupatorioides* var. *ozarkana* Shinnery.

Distribution as shown in Figure 1. Its relationship to the other varieties is discussed in the above introduction.

4b. *B. eupatorioides* var. *corymbulosa* (Torr. & Gray) Shinnery, Sida 4:274. 1971.

Distribution as shown in Figure 1. Shinnery (1946) has given a complete synonymy.

4c. *B. eupatorioides* var. *chlorolepis* (Woot. & Standl.) B. Turner, comb. nov. Based upon *Kuhnia chlorolepis* Woot. & Standl., Contr. U.S. Natl. Herb. 16:177. 1913. *Kuhnia rosmarinifolia* var. *chlorolepis* (Woot. & Standl.) Blake (1940). *Brickellia rosmarinifolia* ssp. *chlorolepis* (Woot. & Standl.) W.A. Weber (1983).

Clavigera corymbosa DC. (1836). *Brickellia corymbosa* (DC.) A. Gray (1852). *Coleosanthus corymbosus* (DC.) Kuntze (1891).

Kuhnia schaffneri A. Gray (1882).

Kuhnia leptophylla var. *mexicana* Shinnery (1946). *Brickellia leptophylla* var. *mexicana* (Shinnery) Shinnery (1971).

Kuhnia microphylla Shinnery (1946).

Distribution as shown in figures 1 and 2. This is a relatively common roadside plant across most of the Central Plateau of México. As indicated in the above synonymy, if treated as a variety of *B. eupatorioides*, the earliest available name for that category is var. *chlorolepis*, Blake having proposed this in 1940. The automatic name, var. *rosmarinifolia*, cannot apply to this taxon, or any other taxon of the *Brickellia eupatorioides* complex, since it is apparently typified by an element that probably does not belong to the complex, perhaps not even to *Brickellia* itself (Shinnery 1946 p. 143).

I have included *Brickellia corymbosa* (DC.) A. Gray in synonymy here (not to be confused with *B. eupatorioides* var. *corymbulosa*) since, by its description, type locality (vicinity of León, Guanajuato, México, *Mendez s.n.*, G-DC) and my examination of the excellent microfiche of the type (G-DC!), the plant concerned appears to belong to the var. *chlorolepis*. Nevertheless, Robinson (1918), McVaugh (1984) and King & Robinson (1987) maintain the species. McVaugh, however, keyed it next to his *B. schaffneri* (= *B. eupatorioides* var. *chlorolepis* of the present treatment), distinguishing between these largely by the length of the lateral hairs along the pappus bristles, a weak and variable character for specific recognition.

- 4d. *B. eupatorioides* var. *floridana* (R.W. Long) B. Turner, comb. nov.
Based upon *Kuhnia eupatorioides* var. *floridana*, R.W. Long, *Rhodora* 72:39. 1970.

Kuhnia mosieri Small, Man. S.E. Fl. 1329,1508. 1933. *Brickellia mosieri* (Small) Shinnery, *Sida* 4:274. 1971.

Distribution as shown in Figure 1. Long, correctly I think, reduced this taxon to varietal rank, placing it under the generic name *Kuhnia*. Unfortunately, he provided a new varietal name based upon a newly designated type. If treated at the varietal level, this is the correct name to be used, hence the new combination within *Brickellia* as adopted here.

- 4e. *B. eupatorioides* var. *gracillima* (A. Gray) B. Turner, comb. nov.
Based upon *Kuhnia eupatorioides* var. *gracillima* A. Gray, Boston J. Nat. Hist. 6:218. 1850. *Kuhnia rosmarinifolia* var. *gracillima* (A. Gray) Blank (1907).

Kuhnia leptophylla Scheele (1848). *Brickellia leptophylla* (Scheele) Shinnery (1971).

Distribution as shown in Figure 1. If treated at the varietal level, this taxon must take the name var. *gracillima*, in spite of the earlier specific name, *K. leptophylla*.

The var. *gracillima* is clearly closely related to, and probably derived from, the var. *chlorolepis*. Gray, as noted above, treated it as a variety of *Kuhnia eupatorioides*, but Shinnery (1946), maintained it as a species, largely because he thought it to be confined to a unique habitat, gravelly stream beds along the Balcones Escarpment of central Texas. I have observed quite large, relatively uniform, populations of the taxon in such habitats, especially along the upper reaches of Barton Creek in Travis County. In this area, *B. eupatorioides* var. *corymbulosa* may be found on the drier calcareous hillsides, usually in grassy sites of juniper-oak woodlands. I have yet to find the taxa growing together

or with any indication that they might be forming hybrids. Nevertheless, var. *gracillima* appears to intergrade westward into the var. *chlorolepis* and I can see little justification in its recognition at the species level, since there is little other than leaf width to distinguish between the two.

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